

CLAIMS

[1] An amplifier having a gain extension characteristic which presents an increase in gain in response to an increase in input power or output power in a certain range of the input power or the output power, said amplifier characterized by having;

- 5 an output characteristic that when said amplifier is applied with two wave signals at close frequencies, a phase of a third-order inter-modulation distortion rotates 90 degrees or more from a phase of the two wave signals at a time when the two wave signals match in phase.

[2] An amplifier having a gain extension characteristic which presents an increase in gain in response to an increase in input power or output power in a certain range of the input power or the output power, said amplifier characterized in that:

- 5 a mechanism for compressing an amplitude at high frequencies is provided at an input of said amplifier.

[3] An amplifier having a gain extension characteristic which presents an increase in gain in response to an increase in input power or output power in a certain range of the input power or the output power, said amplifier characterized in that:

- 5 an emitter grounded amplifier circuit comprising a first bipolar transistor has a base terminal to which an input matching circuit and a cathode of a first diode for supplying a bias voltage are connected through a first impedance element which does not block a direct current, and said first diode has an anode which is connected to a reference power supply which

10 presents a sufficiently low impedance at high frequencies.

[4] The amplifier according to claim 3, characterized in that:
said first diode has a cathode area which is 1/10 or more the size
of an emitter area of said first bipolar transistor.

[5] An amplifier having a gain extension characteristic which presents
an increase in gain in response to an increase in input power or output power
in a certain range of the input power or the output power, said amplifier
characterized in that:

5 a first diode is arranged in a forward direction between a base
terminal of an emitter grounded amplifier circuit comprising a first bipolar
transistor and a reference voltage terminal for supplying a base bias voltage
to the base terminal, and a circuit comprising a second diode connected in
series with a first impedance element which does not block a direct current is
10 connected in parallel with said first diode such that said second diode is
oriented in the forward direction.

[6] The amplifier according to claim 5, characterized in that:
said second diode comprises a base-emitter of a third bipolar
transistor which has a collector connected to a bias power supply, an emitter
connected to said first impedance element, and a base connected to the
5 reference voltage terminal.

[7] The amplifier according to claims 3 to 6, characterized in that:
said first diode comprises a base-emitter of a second bipolar

transistor which has a collector connected to the bias power supply, an emitter connected to said first impedance element, and a base connected to
5 the reference voltage terminal.

[8] The amplifier according to claims 3 to 7, characterized in that:
said first impedance element comprises a circuit which is
comprised of a capacitance and a resistor in parallel.

[9] The amplifier according to claims 3 to 8, characterized in that:
a high-frequency impedance, when said emitter grounded
amplifier circuit is viewed from an input terminal, is higher than a high-
frequency impedance, when a bias supply circuit is viewed from the input
5 terminal.

[10] A multi-stage amplifier comprising at least two or more
amplification stages and having a gain extension characteristic which
presents an increase in gain in response to an increase in input power or
output power in a certain range of the input power or the output power, said
5 multi-stage amplifier characterized in that:

in a power range in which the gain extension characteristic is
provided, at least one stage of said amplification stages other than a final
stage has an output characteristic such that when said amplifier is applied
with two wave signals at close frequencies, a phase of a third-order inter-
10 modulation distortion rotates 90 degrees or more from the phase of the two
wave signals at a time when the two wave signals match in phase.

[11] A multi-stage amplifier comprising at least two or more amplification stages which have a gain extension characteristic which presents an increase in gain in response to an increase in input power or output power in a certain range of the input power or the output power, said
5 multi-stage amplifier characterized in that:

a mechanism for compressing an amplitude at high frequencies is provided at an input of at least one stage of said amplification stages other than a final stage.

[12] The multi-stage amplifier according to claim 11, characterized in that:

said amplifier circuit, at the input of which the mechanism for compressing the amplitude is provided, comprises an emitter grounded
5 amplifier circuit including a first bipolar transistor which has a base terminal connected to an input matching circuit and to a cathode of a first diode for supplying a bias, wherein said first diode has an anode connected to a reference power supply which presents a sufficiently low impedance at high frequencies.

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[13] The multi-stage amplifier according to claim 12, characterized in that:

said first diode has a cathode area which is 1/10 or more as large as an emitter area of said first bipolar transistor.

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[14] The multi-stage amplifier according to claims 12 to 13,

characterized by comprising:

a first impedance element which does not block a direct current in series with the base terminal of said emitter grounded amplifier circuit

5 comprising the first bipolar transistor.

[15] The multi-stage amplifier according to claim 11, characterized in that:

said amplifier circuit, at the input of which the mechanism for compressing the amplitude is provided, comprises a first diode arranged in a forward direction between a base terminal of an emitter grounded amplifier circuit comprising a first bipolar transistor and a reference voltage terminal for supplying a base bias voltage to the base terminal, and a circuit having a second diode connected in series with a first impedance element, connected in parallel with said first diode such that said second diode is oriented in the

10 forward direction.

[16] The multi-stage amplifier according to claim 15, characterized in that:

said second diode comprises a base-emitter of a third bipolar transistor which has a collector connected to a bias power supply, an emitter connected to said first impedance element, and a base connected to the reference voltage terminal.

[17] The multi-stage amplifier according to claims 14 to 16, characterized in that:

said first impedance element comprises a circuit which is

comprised of a capacitance and a resistor in parallel.

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[18] The multi-stage amplifier according to claims 12 to 17,
characterized in that:

said first diode comprises a base-emitter of a second bipolar
transistor which has a collector connected to the bias power supply, an
5 emitter connected to said first impedance element, and a base connected to
the reference voltage terminal.

[19] The multi-stage amplifier according to claims 12 to 17,
characterized in that:

said amplifier circuit, at the input of which the mechanism for
compressing the amplitude is provided, is an amplifier circuit which presents
5 an impedance, when said emitter grounded amplifier circuit is viewed from an
input terminal, that is higher than an impedance, when a bias supply circuit is
viewed from the input terminal.

[20] The multi-stage amplifier according to claims 12 to 17,
characterized in that:

an amplification stage at or after said amplifier circuit having the
mechanism for compressing the amplitude at the input is provided presents
5 an impedance, when said emitter grounded amplifier circuit is viewed from an
input terminal, that is higher than an impedance, when a bias supply circuit is
viewed from the input terminal.